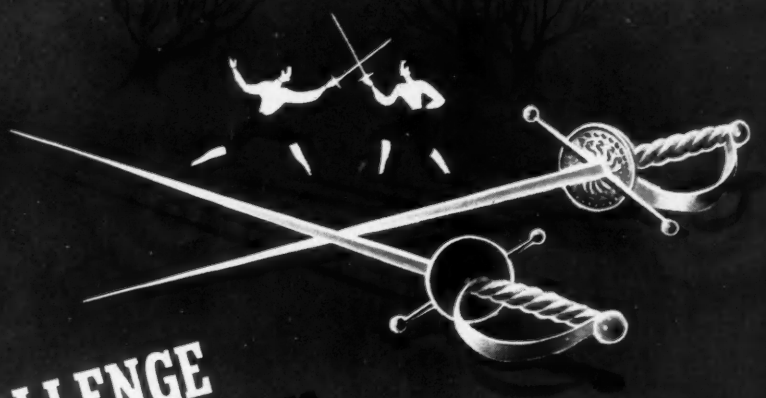
evoted to
EXTILE
EMISTRY
EACHING
DYEING
RINTING
INISHING

MBER 6, 1944
ME 33, No. 23

AL PUBLICATION
of the
ROCEEDINGS
CAN ASSOCIATION
EXTILE CHEMISTS
ND COLORISTS

AMERICAN DYESTUFF REPORTER



CHALLENGE TO COLORISTS

What are proper dyestuffs to use on new fibers and blends? . . . To what extent will choice of dyestuffs be affected by radically different dyeing equipment and techniques? . . . What about the dyeing problems arising from the demand for water repellency, crease resistance, flame-proofing, etc?

Meeting these new problems poses a series of challenges for all colorists. And ready to act as reliable "seconds" are Du Pont's Laboratories and its Technical Staff with a fund of up-to-date information. E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Division, Wilmington 98, Delaware.

Du Pont Dyestuffs

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

DU PONT DYESTUFFS

Durable Norane

PAT. REG.

✓ ***Laboratory Certified for*** **WATER-REPELLENCY**

✓ ***Laboratory Certified for*** **DURABILITY**

Warwick Chemical Company, makers of IMPREGNOLE repellents, now presents NORANE, a new durable repellent. Already millions of yards of NORANE processed fabrics are being used by the government for our armed forces. A limited supply for civilian use is now available. Your inquiries are respectfully solicited.

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A penetrant and levelling medium for direct, union, and CELANESE* dyes. Effective either for stripping or for level dyeing when working with many of the vat type dyes.

A stable, dispersing penetrant for rotproof and mildewproof processing.

Economical and labor saving.

During the war LEVELENE* is proving of value in the processing of war goods.

During reconversion LEVELENE* can be of equally high value for stripping and re-dyeing surplus vat dyed and other war goods.

RATHER than ask for a laboratory sample —HAVE one of our technical men bring with him a sufficient quantity for a practical mill run THEN judge for yourself as many mills have done and profited thereby.

*Reg. U. S. Pat. Off.

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PERMA-PAR*

TEXTILE CHEMICAL SPECIALTIES

PERMA-FIX

A compound which fixes direct colors on cottons and rayons, also acts as a softener. Use of this product greatly reduces the bleeding and crocking of direct colors. It is resistant to washing and dry cleaning.

PERMALENE D

A viscous amber liquid soluble in water at 90° F. It readily replaces soap in soaping-off and is economical and efficient in scouring and dyeing synthetic fabrics.

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An alkyl aryl sulphonate type wetting agent which is active at high and low temperatures. Recommended for soaking hosiery yarn either on cones or in skeins, and all other textile processing.

PERMA-PAR K

A two-purpose boil-off compound and softener which serves as a prefinish. It increases dye solubility and color value. Especially recommended for print goods and as a dyeing

VELVAMINE K-90

This improved product imparts an odorless finish which is resistant to washing and dry cleaning. A finishing and softening agent for all fabrics. Ideal when used in conjunction with starches, resins, dullers and other finishes where colloidal suspension is desired, and acts as a plasticizer to such finishes on the cloth.

PERMALENE WS

A white powder soluble in water at 80° F. Unusually efficient as a water softener for all wet processing, including dyeing of aralac and washing of prints. An excellent dye or boil-off activator.

PERMALENE SOL

A penetrant and cleaner developed for use on all fabrics, especially tightly woven and high twist materials. Excellent for removing loom grease and graphite. Recommended for pad dyeing where it assures thorough uniform penetration.

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A cation active softener used in all branches of textile processing. Low cost per yard has resulted in a broad use of this product which produces excellent results. Resistant to washing and dry cleaning.

PERMA-PAR R

An improved cation active finish for all types of fabrics. It is odorless and when used in the last rinse it imparts a soft, spongy, mellow hand. It is resistant to washing and dry cleaning.

PERMA-TERGE

A highly efficient detergent for all types of spun rayons, rayon sheers, rayon crepes, pigments and bright yarns, crepes, taffetas, nylons, aralac and aralac mixtures, acetate and acetate blends.

VAPOLINE

A carding oil for oiling loose wool or shoddy. It has no moisture content or free fatty acid. Goods treated with this product will not yellow or go rancid upon prolonged

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OUTSTANDING MILDEW PROOFING AGENT

Comprehensive, comparative tests, made by United States Testing Company, Inc., show this product to be highly fungistatic, bacteriostatic, bactericidal and fungicidal. All these properties are retained up to 30 washings.

The compound is non-toxic, non-irritating and is not a cutaneous sensitizer.

*Reg. U. S. Pat. Off.

A copy of this 27-page report number 52301 is obtainable upon written request to the Refined Products Company, Lyndhurst, N. J., sole manufacturers and U. S. distributors.

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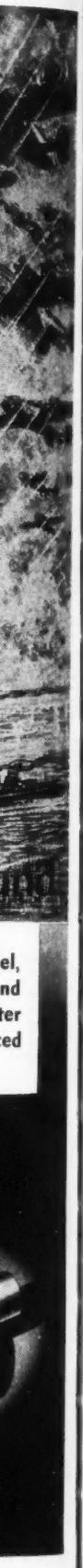

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A complete range of Acid Dyeing Colors... Fast to Light – Washing – Perspiration – Crocking – Sea Water and Wear... Level Dyeing on Mixed Wool and Carbonized Goods without neutralization – with excellent penetration. Most types are dischargeable with rongalite.

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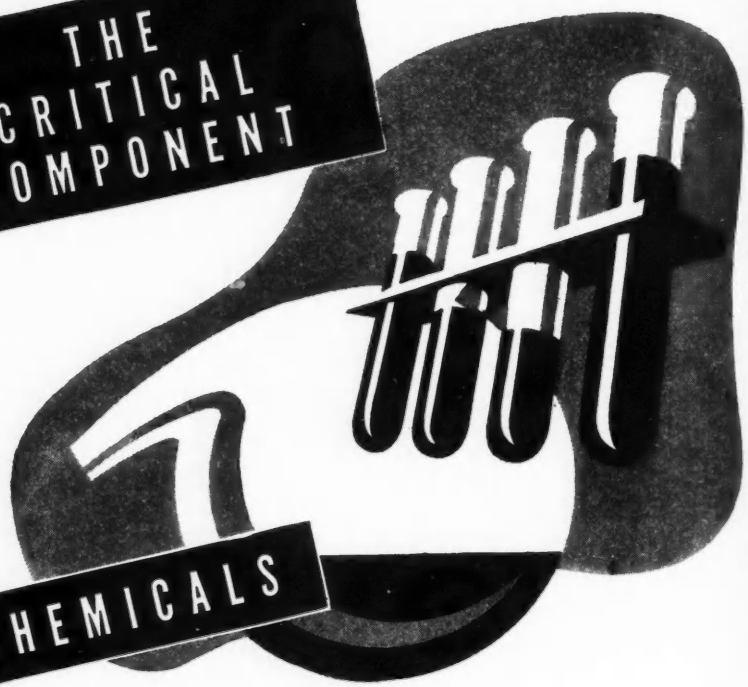
THE CRITICAL COMPONENT



TEXTILE CHEMICALS

LABORATORY-CONTROLLED THROUGHOUT PRODUCTION — EMERY INDUSTRIES INC.

Each component of a process using chemicals is manifestly a critical one. This is axiomatic. Yet, in every process, there is one component that is more critical than any other in its effect on the finished product. This might be a material, or it might be the skill and experience of the manufacturer producing it . . . or both. You look to your source of supply because that component does affect the efficiency of your processes.

Oils for processing textiles have been developed by Emery with that thought in mind. They include the well-known, time-tested Twitchell Wool and Worsted Oils, 3X and 304 for sanforized finishes, and oils 681 and 685 used in the production of rayon yarns. These oils resist oxidation, store well on stocks, and lose none of their properties on long standing. All of these oils can be scoured off easily with a minimum quantity of mild alkali . . . soda ash, for example.

Emery's red oils, both distilled and saponified (undistilled), and other textile oils are available over a wide range of specifications. Let us know your requirements because we would like to recommend the grade most suitable for the best results, and the greatest economy. We will gladly send you samples on request and can make prompt delivery of your requirements.

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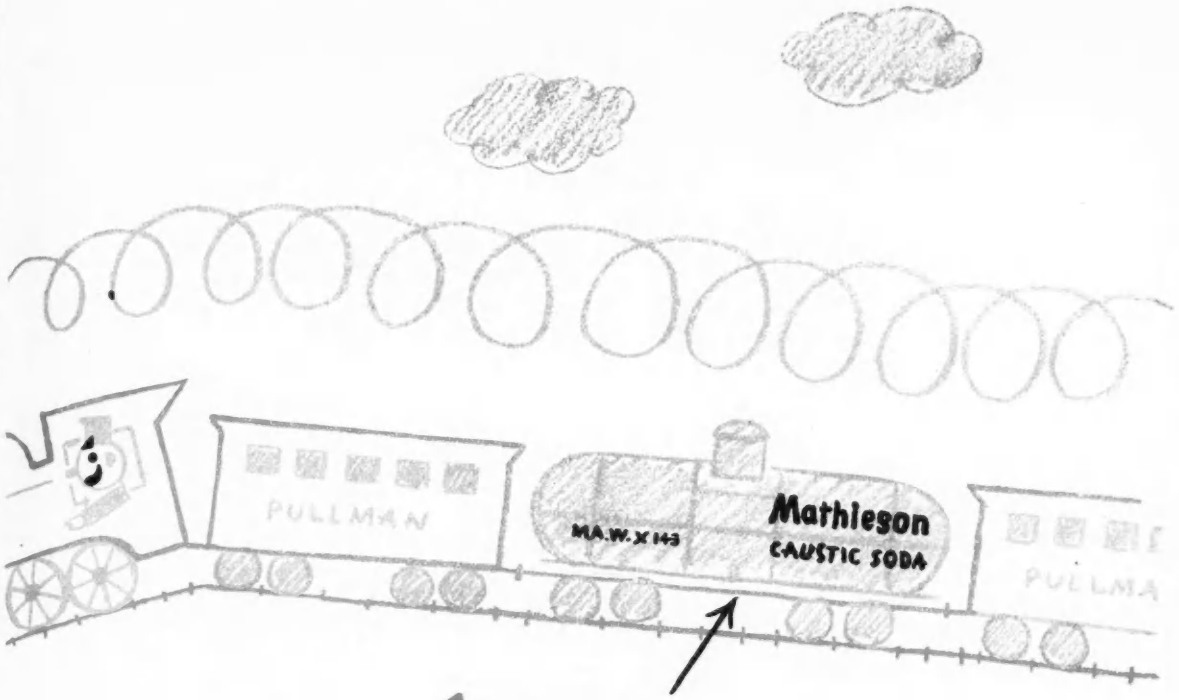

it hasn't happened yet-

NO, we haven't yet had to attempt passenger train service to meet delivery schedules for war-vital Mathieson Caustic Soda. The great Mathieson fleet of tank cars rides the rails with guns, tanks, airplane parts—definitely travels first-class.

And no Pullman car is more carefully groomed between trips than a Mathieson Liquid Caustic tank car. Each is minutely inspected and cleaned at our own car shops—checked to assure fast delivery of clean, pure caustic for the thousand-fold job it does to speed Victory. Yes—because of the grand job the railroads are doing to move war supplies and Mathieson's attention to important details—it's first-class transportation for a top-class product!

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CHEMICALS

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DYED ACETATE RAYON!

finished with

ARIPEL-FS

Reg. U.S. Pat. Office

Has Excellent Fastness to Atmospheric Gases

Yes, acetate rayon dyed fabrics treated with double-action ARIPEL-FS are remarkably resistant to the fading action af atmospheric gases as proven by the "Gas Chamber" test.

ARIPEL-FS is also an effective softener and therefore works two ways in a one bath treatment —

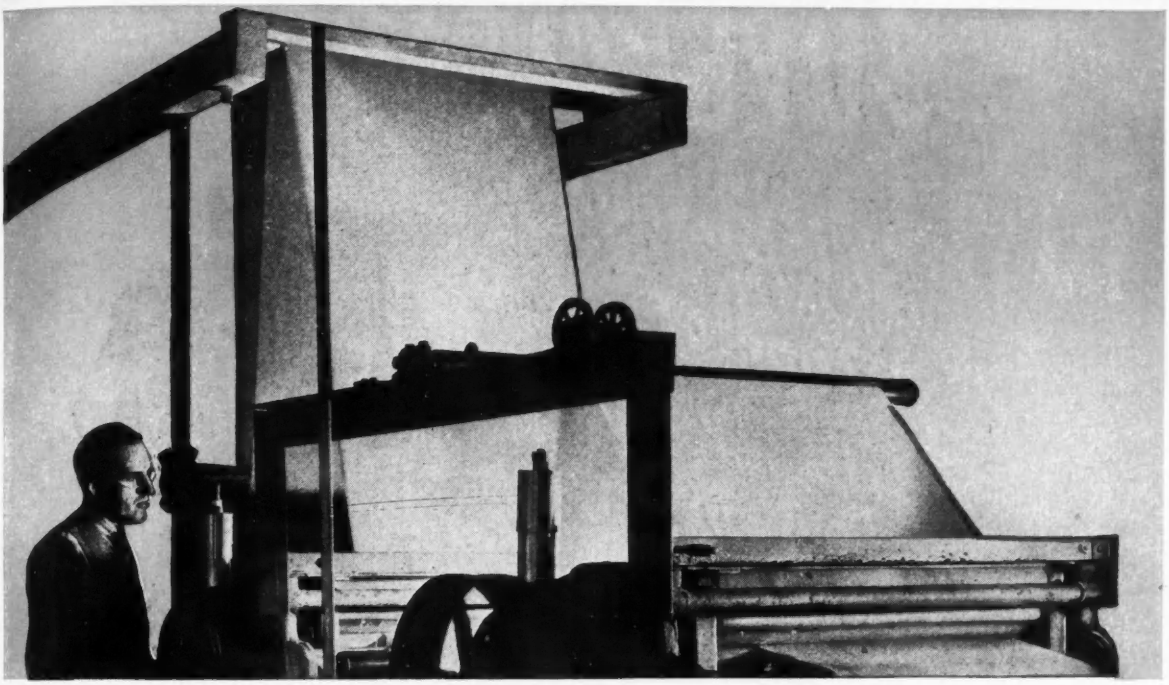
- **Increases the gas-resistance of the color.**
- **Imparts a soft, smooth pleasing finish.**

ARKANSAS CO. INC.

Manufacturers of Industrial Chemicals for over 40 Years

Newark, New Jersey

DUPONT *CONTINUOUS* PEROXIDE BLEACH



INCREASES PRODUCTION OF PRINT CLOTHS

. . . Cuts Bleaching Time to Two Hours

Do you make lightweight cotton print cloths? How would you like to cut bleaching time from 20 hours to 2 hours? To save substantially on steam and water? To have a bleaching range laid out for most efficient operation?

All these advantages can be yours if you install Du Pont Continuous Peroxide Bleach. It puts bleaching on a streamlined production basis for the first time in textile history. Successful experiences at leading mills have already proved it practical.

Continuous process changes bleaching from an all-day job to a two-hour operation that fits right in with your production schedule. In addition, users enjoy exceptional bleaching flexibility. To change from one fabric to another is a simple matter.

With Du Pont Continuous Process, it is easy to exercise control over such factors as speed . . . steam consumption, caustic and peroxide . . . temperature . . . time.

One result of this is uniformity of color, appearance. Another is high quality of the bleach, and absorbency to improve printing qualities. A third is elimination of kier stains.

Equipment is built by recognized textile finishing machinery manufacturers from designs patented by Du Pont. For information on the use of peroxides in continuous bleach equipment write E. I. du Pont de Nemours & Co., (Inc.), Electrochemicals Dept., Wilmington, Del.

✓ THESE FEATURES

- TWO-HOUR BLEACH
- HIGH PRODUCTION
- FLEXIBLE
- NO KIER STAINS
- ECONOMY
- HIGH QUALITY
- UNIFORM BLEACH
- CONTROLLED
- ABSORBENCY FOR PRINTING

DU PONT

DU PONT PEROXIDES

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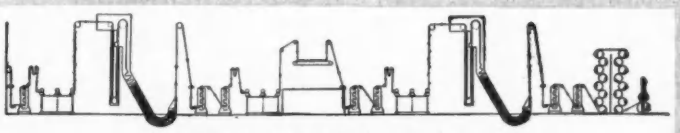
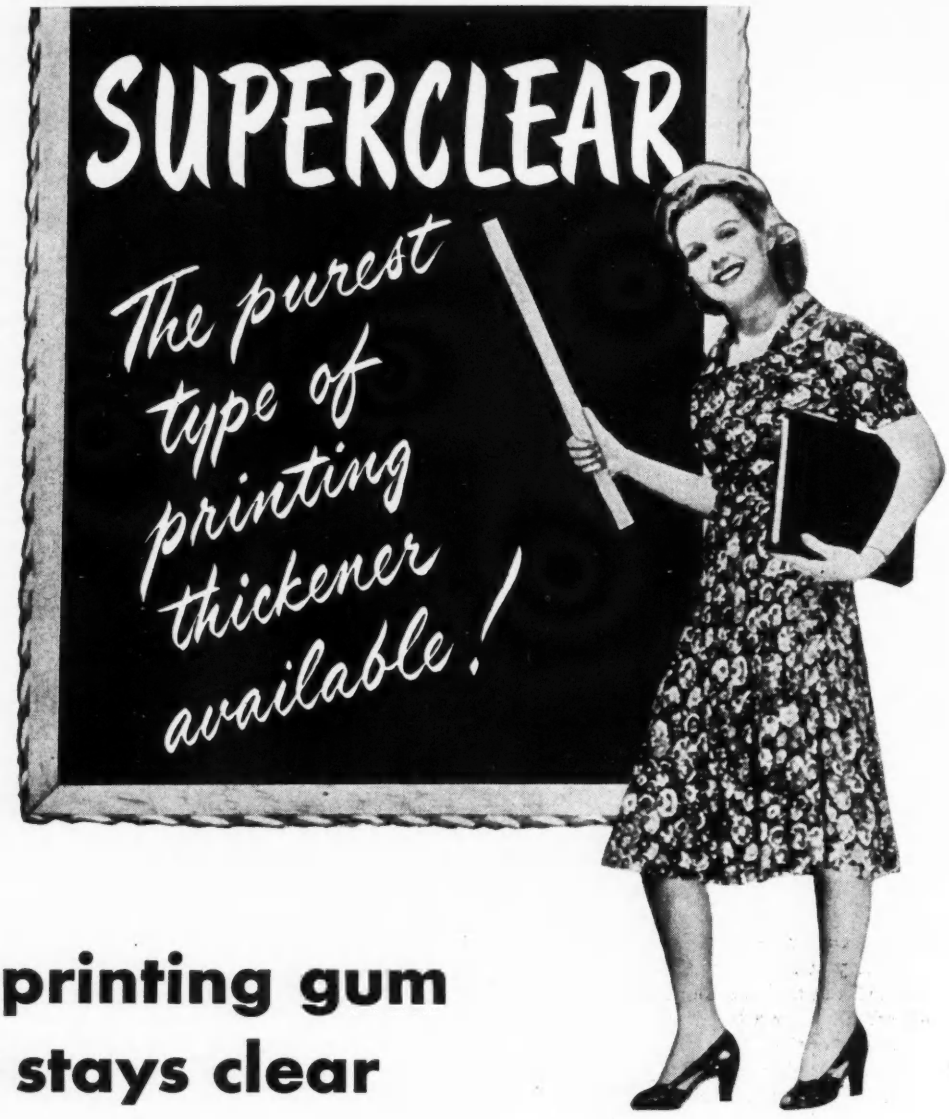


Flow plan of a typical Du Pont continuous unit



The printing gum that stays clear

• Superclear is compatible with all dyestuffs, is easily soluble and removed with a minimum of washing. It does not precipitate with acids or alkalis. Superclear will not become ropey or separate on the machine and does not scratch or stick in the engraving, or mark when the machine is stopped.

Superclear is a natural product—not the result of chemical processing. It does not react with or become part of the chemicals and dyestuffs which it thickens. Superclear is inert and acts only as a thickener. It does not flush off color but is a guaranty of color value.

Make a comparison of Superclear with any product you now use. Let your own tests convince you of Superclear's superiority. A free sample will be sent at once.

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Eastman Fast Yellow GLF

Eastman Fast Yellow GLF, which produces bright shades of neutral yellow on acetate rayon and nylon, **is the first in a line of acetate dyestuffs newly developed with exceptional fastness to sunlight.** Dyed in pastel shades on cellulose acetate rayon, twenty-five to forty hour light fastness is obtained; and in heavy shades, light fastness approaches two hundred forty hours.

Eastman Fast Yellow GLF dyes over temperatures ranging from 130° F. to 190° F. It exhausts rapidly and levels exceptionally well and may be used on either jig or box. It leaves cotton and viscose rayon white and is suitable for cross dyeing.

Eastman Acetate Dyestuffs offer an expanding line of dyes in a wide variety of useful colors for cellulose acetate rayon. Information concerning these dyestuffs and their application to fibers and fabrics may be obtained by writing to TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Company), KINGSPORT, TENNESSEE.

EASTMAN ACETATE DYESTUFFS

Some girls use them for marching . . .

OFFICIAL U. S. NAVY PHOTO

Today, even the top sergeant counts on her legs for more than marching. Because she knows the potency of properly sheathed underpinnings, she's extremely critical of today's hosiery. To her, "service hose" is more than a buyer's term . . . it represents the type of smooth-fitting, properly finished hose that she and her sisters-in-uniform demand and get. Yes, with women in service, just as with women at home, hose must have that soft, sheer, lasting smoky-dullness or they're out. ● For years Fancourt chemists have helped hosiery makers and dyers to satisfy the most beautiful legs in the world . . . the American girl's. Now, with the job harder than ever before, our staff is working night and day to develop formulae for handling all types of new problem-materials. A talk with one of our field men will convince you that we have not worked in vain.

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In Monsanto textile laboratories equally startling increases in wear have been achieved on cotton lawns, spun rayons, tropical worsteds, denims and many other fabrics with a series of new textile finishes based on Monsanto's Lustron (polystyrene) plastics.

The concentrations of these tough resins required for such results are amazingly low. The special formulations being developed are well adapted to existing mill equipment and present mill practices. Thanks to close teamwork between the Monsanto plastics chemists and practical textile specialists working on the general problem of longer wear for tomorrow's fabrics, all the questions you will want to ask are being answered.

In short, the day is not far distant when you may be seeing department stores advertising sheets, work clothes or men's summer shirts finished with a Monsanto plastic to give them *twice or three times the wear of ordinary merchandise!*

If you would like to make sure that *your* fabrics will be among the first that can be so advertised . . . we will be glad to discuss the possibility of arranging trials of the new finishes in your mill. Simply write or wire: Monsanto Chemical Company, Merrimac Division, Everett Station, Boston 49, Mass.

Divisions cooperating in Monsanto textile research in addition to Merrimac Division include: Central Research Laboratories at Dayton, Ohio; Organic Chemicals Division and Phosphate Division at St. Louis, Missouri; Plastics Division at Springfield, Massachusetts.

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The Textile
SERVING ∧ INDUSTRY . . . WHICH SERVES MANKIND

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for Bluish tone Greys

INDIGOSOL Grey IBL produces clear, bluish-tone Greys of very good fastness for printing, dyeing and padding. It can be shaded with any of the Indigosol Yellows, Orange or Browns to obtain any of the shades of Grey desired.

One of its most important characteristics, in addition to its excellent penetration of heavy goods, is that it produces very level shades which are well covered *even in the lightest tones.*

INDIGOSOL Grey IBL is readily soluble and belongs to the class of Indigosols which develop easily.

Also

Pharmasol Brown GRNN

Yellower and brighter in shade

Better Wash Fastness

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NOVEMBER 6, 1944

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The man who makes friends
by
LOOKING FOR TROUBLE

Helping you to maintain standards of shade and fastness despite variations in raw stock and manpower shortages all through the mill is the primary job of National Technical Service today.

"Trouble Shooters" in the full sense of the word, National Technical Service men have the two-fold advantage of National's composite experience in every field where color is used, *plus* the fully-staffed facilities of laboratories attached to all principal National offices.

This service offers practical help on color, dyehouse and printing problems... in maintaining standards and controlling costs on established production... in working out economical formulas on new textiles... in expediting delivery of available National Dyes.

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NOVEMBER 6, 1944

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Members should notify the **Secretary** immediately of all address changes.

BANQUET SESSION OF ANNUAL MEETING

Atlantic City, N. J., October 14, 1944

BOYCE C. BOND
Chairman

CHAIRMAN BOND: Members and Guests of the American Association of Textile Chemists and Colorists: The Philadelphia Section is very glad to sponsor this Annual Convention. Our last annual convention was held in Pinehurst, North Carolina, in the year 1941. Careful thought was given as to whether to hold an annual convention under the existing adverse conditions. It was finally decided that it would be beneficial both to the textile industry and to our Association to hold a technical meeting this year. I believe you will all agree that we have had a most successful technical program, and I want to take this opportunity to express my deep appreciation for the excellent work done by our committees and all others who assisted directly or indirectly in executing this most valuable program. Your attendance and interest have been our reward in making this annual convention a success.

Boyce C. Bond
Chairman, Philadelphia Section

It is my privilege to introduce to you our Toastmaster for the evening. He is a Past President of our American Association, serving the year 1931-32.

I now take great pleasure in introducing Mr. P. J. Wood, Technical Director of the Royce Chemical Company. Mr. Wood!

* * *

Mr. Wood called attention to the excellent program which the Philadelphia Section had arranged and expressed the appreciation of the Association to the following chairmen whose committees had worked so diligently:

Charles A. Seibert, General Chairman.

Charles A. Seibert
Vice-President, A.A.T.C.C.
General Chairman, Annual Meeting

Dr. Glen S. Hiers, Chairman, Technical Program Committee.

Harold B. Dohner, Chairman, Registration and Reservation Committee.

Fred C. Scholler, Chairman, Finance Committee.

Arthur Etchells, Chairman, Exhibition Committee.

Walter G. Hamlen, Chairman, Publicity Committee.

DeHaven Butterworth, Chairman, Banquet Committee.

James P. Conaway, Chairman, Entertainment Committee.

P. J. Wood
Toastmaster

P. J. WOOD
Toastmaster

Lloyd Koons, Chairman, Recreation Committee.

John F. McCoy, Chairman, Transportation Committee.

James Dixon, Chairman, Ladies' Committee.

He then introduced Henry F. Herrmann, chairman of the Corporate Membership Committee, who spoke as follows:

* * *

AN APPEAL FOR CORPORATE MEMBERSHIP SUPPORT

Henry F. Herrmann
Chairman, Corporate Membership Committee

Mr. Herrmann: Mr. Toastmaster, Mr. President, Ladies and Gentlemen, and particularly, the Executives of our Industries:

To the A. A. T. C. C. has fallen the responsibility of creating and maintaining standards for color fastness, for the quality of special finishes, and for certain durability features which are required by the textile industry and the allied chemical supply industry. This work was begun by our Association at its birth as a voluntary contribution because its membership comprises the technicians who are best qualified to understand these problems and solve them.

Today, twenty-four years later, we find that the gift we offered so lightly has developed into a factor of major importance to the industries and what was once a voluntary act is now a deep responsibility. Two wars have driven us to the realization of the fact that American industries must be self-sustaining even in matters of science and the only way we can maintain our independence is to foster the work which has made our present position possible.

Dr. Glen S. Hiers
Chairman, Technical Program Committee

Fred C. Scholler
Chairman, Finance Committee

James P. Conaway
Chairman, Entertainment Committee

Harold B. Dohner
Chairman, Registration and Reservation Committee

Arthur Etchells
Chairman, Exhibition Committee

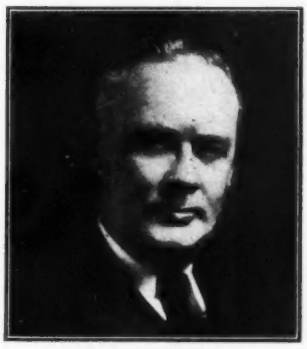
Lloyd O. Koons
Chairman, Recreation Committee

I can offer you no better vehicle to a fuller appreciation of the contribution of the A. A. T. C. C. to our industrial and scientific welfare than to suggest that you permit your imagination to picture the chaos which would result if our Association were suddenly to be disbanded, our standards lost, and our testing methods destroyed. Would American industry want to turn to foreign sources for reaplacements? How long would it take individual mills—or groups of mills —to re-establish standards and testing methods adequate to regulate their operations as an industry? And what would be the cost in actual dollars, in lost time, and expensive mistakes during the interim?

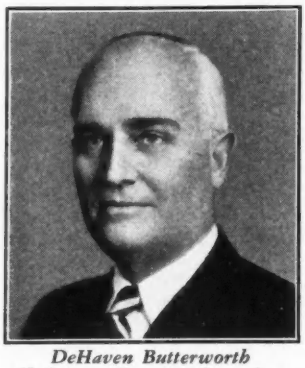
Our Association has functioned so quietly and at so little cost to the industry that its labors are not fully understood by many parties who have derived considerable benefit from them. This is the price of modesty but the fault need not become chronic.

Our research operations have outgrown their old cloak. A new expanded research program has been established which must be implemented with facilities which cost more money than is available to us through our former sources — namely individual memberships and

Walter G. Hamlen, Jr.
Chairman, Publicity Committee



John F. McCoy
Chairman, Transportation Committee



DeHaven Butterworth
Chairman, Banquet Committee

James Dixon
Chairman, Ladies Committee

Major William F. Carey
Commissioner of Parks and
Public Grounds, Atlantic City, N. J.

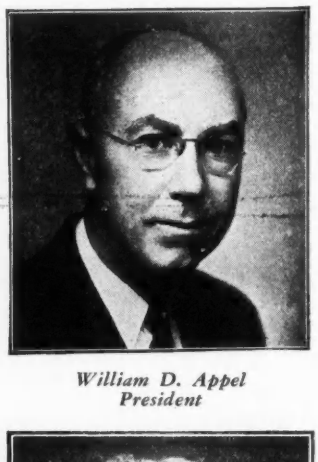
Albert W. Hawkes
Senator from New Jersey

Brig. Gen. W. C. Kabrich
Edgewood Arsenal

a handful of corporate memberships. We cannot ask our individual members, who are themselves salaried employes for the most part, to assume the burden of financing this work. We do not intend to turn to sources which might gladly offer us support in return for selfish benefits. We appeal to you, the executives of the textile industry and of the allied chemical industries, for a practical demonstration of your understanding and appreciation of our work. The A. A. T. C. C. is the industry's own scientific society; its work must go on and we ask for sufficient funds—a very modest sum—to make this possible.

Our present research budget is $35,000 per annum and we will need every dollar when certain volunteer services from which we have benefited for years, must be replaced on a salaried basis. About one-half of this fund is covered by the dues subscribed by present corporate members but more such memberships are required and the dues of many on our list must be increased if we are to attain our objective.

PHOTOS AT ANNUAL BANQUET
We are deeply indebted to John E. Trezise of Onyx Oil & Chemical Co. for the photos taken of the speakers during the Annual Banquet and the presentation of the Olney Medal.



William D. Appel
President

By the coming December 15th, we wish to submit to our secretary a membership roll, for billing purposes, which will yield the required $35,000. I am taking this opportunity of making a direct appeal to the corporation executives who are here to-night to support the Association's research program. Our committee is small and we have no high pressure soliciting facilities. We will be grateful for your response to the application of the committee man whose privilege it happens to be to solicit your membership or your consent for an increased rate of dues.

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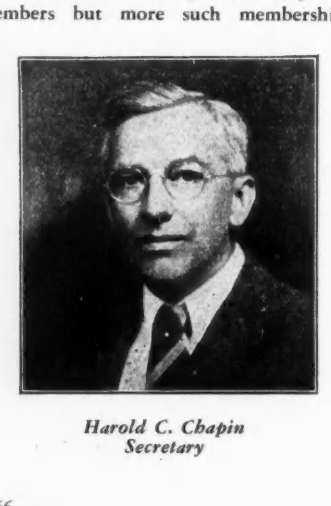
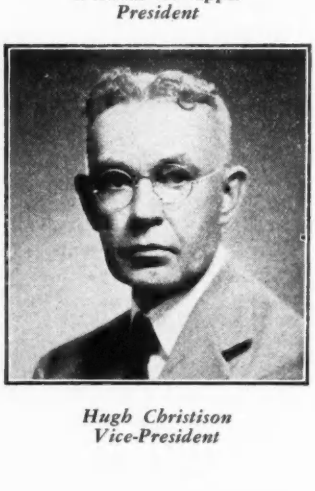
Mr. Wood then introduced Major William F. Carey, Commissioner of Parks and Public Grounds, who represented the Mayor of Atlantic City. Major Carey welcomed the Association to Atlantic



Harold C. Chapin
Secretary



Hugh Christison
Vice-President

Wm. R. Moorhouse
Treasurer

City and presented the Toastmaster with the key to the city.

Next to be introduced was Senator Albert W. Hawkes, Senior Senator from New Jersey, who spoke on several matters of importance to the textile and chemical industry.

The main address of the evening was delivered by Brigadier General W. C. Kabrich, Chief of the Technical Division of the Chemical Warfare Service, U. S. Army at Edgewood Arsenal, Maryland. General Kabrich referred to the work of the chemical warfare service in World War II.

Dr. Robert E. Rose, Past President of the Association, was next introduced by the Toastmaster and the meeting turned to the first award of the Olney Medal.

* * *

THE OLNEY MEDAL

ACCOMPLISHMENTS OF THE MEDALIST

DR. R. E. ROSE: Members of the Association: It gives me a great deal of pleasure to be before you again, and as I think of all the pleasant tasks that have come my way, and they have not been few, this is the very pleasantest because it is my privilege tonight to dwell upon the scholarly attainments of the first Olney Medalist.

"Scholarly" is derived from the word scholar, and our beautiful English language, in this as in other cases shows an understanding for the word in connotation with the human activity it describes, for do we not say the scholar sits at the feet of learning, and do we not call him who has learned and who teaches the scholar also a scholar? Thus there is no beginning and no end to scholarship.

Dr. Olney has always been a scholar. From the very first he has endeavored to find out all that he could, because it interested him to know how things came to pass and what could be reasoned from that knowledge. From the very beginning he has striven with the greatest self-devotion to pass his knowledge on to others. He is a scholar in every sense.

If you want to be more particular, look up the records of that institution which has had the good fortune to have Dr. Olney associated with it for years upon years, the Lowell Textile School; the Lowell Textile Institute as it became. When you go to the records, you will find paper after paper that owes its inception, owes its originality, owes the treasure it contains to Dr. Olney. Dr. Olney has the endearing characteristics of the man who thinks it better to inspire than to claim credit. You will find, if you look at those papers, that a great many of them will not carry Dr. Olney's name. They will be published in the name of the younger man to whom it meant so much that he should have, as it were, right of way in connection with this piece of work. That is a very high tribute to the generosity of our Medalist.

We owe everything, in a way, to Dr. Olney, because very shortly after the last war he realized that we were in the unfortunate position of lacking a language and an organization to use the language. After all, if we know the meaning of things and cannot communicate that knowledge to each other, a great deal of the fruit of the knowledge is lacking. It was his indomitable energy that created an organization that would allow us to communicate with each other through the *Dyestuff Reporter* which afterwards contained the proceedings of our Association. It was he who called together the group that finally developed into this highly successful organization of which we are all so proud.

The Olney Medal

Let me remind you that for seven long years—and not lean years but very fruitful years—Dr. Olney was our President. We, of course, took credit for honoring him by leaving him President, when actually we saved ourselves a job, because he did it so very well.

I don't need to dwell on what that Association has come to mean. It has given us a place in the world of science, in the world of technology. We now have a language and that language has come of these innumerable committees. Sometimes there is a certain amount of levity in connection with the numerous committees we have, but they all function, and if they function it is because at the center of things, just as the mainspring is at the center of the clock, Dr. Olney has never for one moment released the essential pressure to keep the machine going.

And then, who but a scholar can teach? And Dr. Olney's record as a teacher is very remarkable. To teach is difficult as I who have taught know, to teach chemistry is extremely difficult, and to make chemistry atractive is still more difficult. Dr. Olney has done all all these things well, because no matter where you go in this broad land of ours, no matter if you pass the frontier, which doesn't exist in a way, and pass into Canada, or into other countries, you will find those who, when you mention Dr. Olney, will greet his name with an obvious expression of happiness at recalling that time at Lowell when they learned to be textile chemists, colorists, or whatever else Dr. Olney taught them.

In addition to being all this —I don't know how he has done it, because he has worked hours and hours—he managed to get out a book for us, our Year Book, which is now a standard. Of course, he had help, but what man could have done it even with help as well as he did it? That book has gone forth as a textbook which is essential wherever dyeing or the processing of textiles is studied.

Finally, I can say that with all this he has not become inhuman, he is not a recluse, he is not one of these students who vegetate in dark cells. Quite the contrary, he is a man of the world. He has succeeded as an executive, he has succeeded as a citizen and he has succeeded even in having hobbies such as the collection of stamps.

How could we better honor our Past President, and, in a sense, honor the medal we are conferring, than by conferring it on Dr. Olney? And now I shall turn to Mr. Howes and ask him to present the Medal.

PRESENTATION OF THE MEDAL

A. P. HOWES: Dr. Olney: Because I have known you so intimately these many years as a business associate, a close friend, and a mentor in all things that make for a fuller, richer life; because I know full well from frequent contact with others whose paths have crossed yours that your influence upon them has been equally helpful and inspirational; because of my sincere conviction that you are truly one of the elect of this world, it is a tremendous satisfaction to me that you have been chosen by your peers in this Association as the first recipient of the medal which the Howes Publishing Company has had the honor of endowing in your name, and it is a great privilege for me to have been asked to make its presentation.

And now, in the words of the Association's Committee of Award—a committee composed of our President, Mr. Appel, as chairman ex-officio, Dr. Neville of Lehigh University, Mr. Philip of the Callaway Institute, Mr. Seibert of the duPont Company, and Mr. Barnard of the Pacific Mills—

"Louis Atwell Olney, scholar, teacher, leader: you have done very much for us and for the Textile Industry.

"As a symbol of the appreciation of your associates, we make you the first Olney Medalist, knowing that in your understanding way you will sense the good will, the affection, and the feeling of indebtedness for which this token stands."

Dr. Olney!

. . . The audience rose and applauded as the presentation was made. Dr. Olney then made the following address:

ADDRESS OF THE MEDALIST

DR. LOUIS A. OLNEY: In the acceptance of this honor I not only wish to express my great pleasure, but more particularly my deep appreciation of the recognition which the Association has bestowed upon me through the awarding of this the first A. A. T. C. C. Medal.

I feel amply repaid for any time or effort I may have contributed toward the growth of the Association, and trust that I may be able to serve in one capacity or another for some time to come.

At my seventieth birthday party which the New York Section so graciously staged for me, and which unfortunately I was unable to attend, I sent a short letter which mentioned briefly some of the developments in the dyestuff and textile finishing industries which it had been my privilege to witness. With your indulgence I will at this time amplify somewhat along the same line.

A. P. Howes presenting the first Olney Medal to Dr. Louis A. Olney as Dr. Robert E. Rose looks on.

During my senior year at Lehigh University, we went on a so-called "shop inspection trip" to Philadelphia. Among other places, we visited the Eddystone Print Works.

I was, to say the least, thrilled to see large rolls of plain white cloth put into one end of a machine and then to see the same cloth come out at the other end in a few seconds, covered with a multi-colored design of great beauty and brilliancy.

It was my desire to know the whys and wherefores of these marvelous results, probably more than anything else, that headed me in the direction which I have followed for nearly 50 years.

It was my good fortune to have the opportunity to develop, in my inexperienced way, a course in textile and dyestuff chemistry at Brown University during 1896-7. This experience accompanied by the enthusiasm of youth gave me a rather wavering confidence to accept the position at the Lowell Textile School, known in more recent years as the Lowell Textile Institute.

When I came to Lowell in June of 1897, I anticipated finding a well organized and equipped laboratory, but instead I was ushered into an entirely empty room of about 5000 sq. ft. of floor space. A few weeks previously there had been a fire and in many places there were holes burned in the floor as well as in the ceiling. I was told that the school would open in September and the laboratories must be ready at that time.

The summer was a whirl of carpenters, plumbers, electricians, painters, packing cases, and what not, but we were ready for business in the fall with double the number of students we had planned upon.

My friends have frequently asked me how I had the nerve to accept such an undertaking with so little experience; I sometimes wondered myself, but the answer is fairly simple.

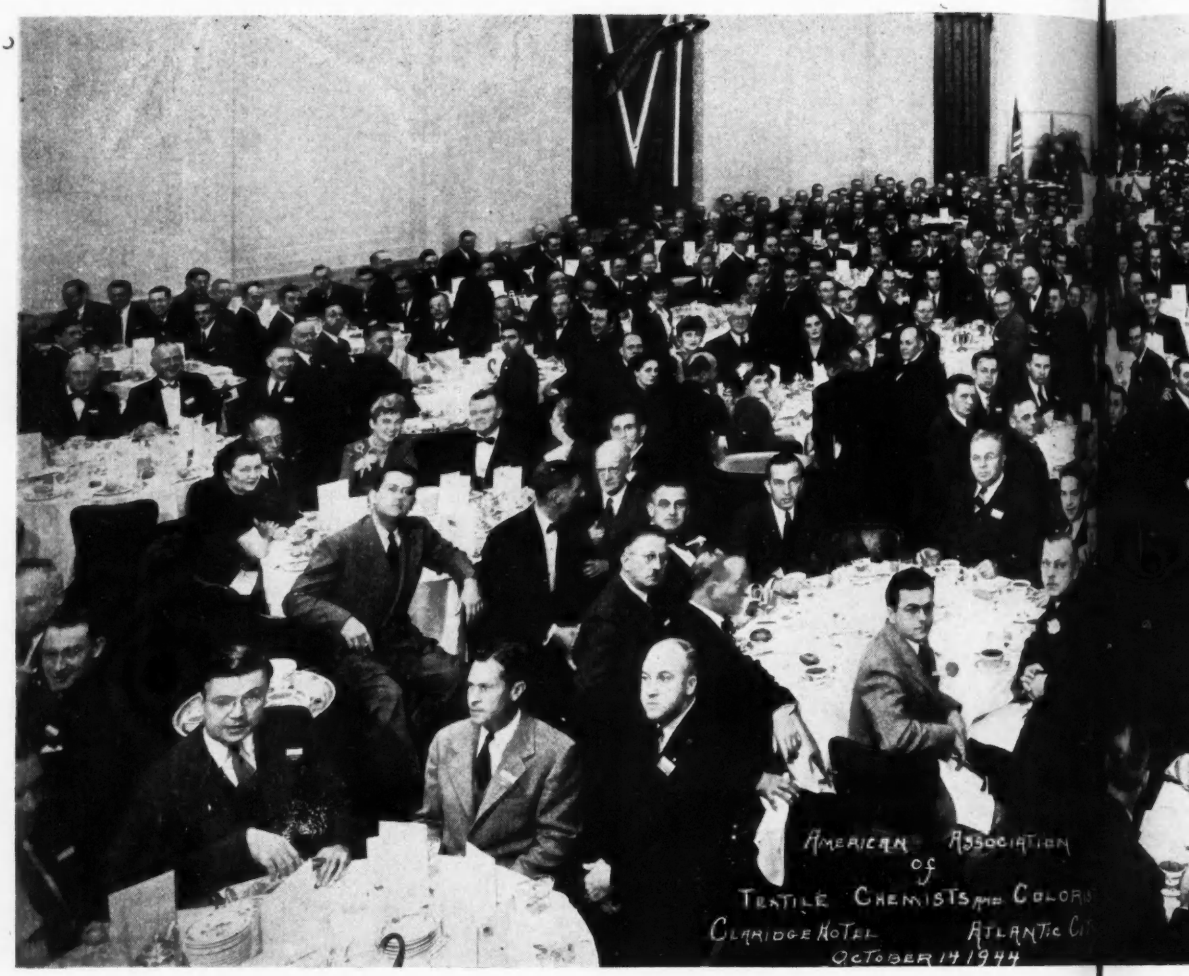
The first year I had only the freshman class to deal with and this involved largely straight chemistry. This gave a whole year to prepare for the sophomore class and during that year, for the Junior class and so I was able to keep well ahead of the students until a fairly reasonable curriculum had been built up.

Furthermore a rare and valuable experience came to me through the fact that in my first year evening class there were dyers from nearly every mill in the vicinity of Lowell and the superintendents of two large print works and a bleachery. They were all very friendly and for several years I spent most of my spare time with them in their plants. Furthermore, I had the opportunity to work for one summer in the dyeing and finishing departments of a woolen mill.

LOUIS A. OLNEY, Sc.D.

First Olney Medalist

Awarded October 14, 1944



A PORTION OF THE GROUP ATTENDING THE ANNUAL BANQUET A[T]ESENTA[T]

While at Brown University in 1896 I had the opportunity of seeing the insoluble azo dyes, now commonly called the naphthol dyes, introduced into a print works near Providence. The common para red was the first and this was followed by the alpha naphthylamine red.

When I came to Lowell I found that the Hamilton Print Works which had specialized for many years on the production of Turkey Red prints and dyeings produced with alizarine, was gradually replacing these with para reds, the most popular of the naphthol dyes at that time. Furthermore I noted that they failed to change the labels and the para reds went out under the description of Turkey Red. Needless to say that this was long before the days of the Federal Trade Commission.

Enormous quantities of Natural Vegetable Indigo was then being used and this required several weeks of continuous grinding in noisy machines, which could be heard several blocks away from the dye house. It was not until several years later when natural indigo was replaced with the synthetic indigo, which fortunately did not require this long drawn out noisy grinding process, that this nuisance was abated.

The Lowell Textile School moved from hired quarters in down town Lowell to its present imposing location on the Merrimack River during the winter of 1902 and 1903.

It was not long after this that Mr. Brown, then manager of the Boston office of the Pickhardt and Kutroff Co. (later the Badische Co.), called to see our new buildings. I remember very vividly how during our conversation he drew from his pocket a skein of cotton yarn, dyed a deep but rather brilliant blue. Said he, "This is an entirely new type of dye which arrived from Germany this week. They call it Indanthrene Blue and it is dyed much the same as Indigo, but is much faster." As the Badische Co. was one of the leading makers of synthetic indigo at that time, I asked if they would not be competing with themselves if they put this dye on the market. He smiled and said, "This will go up on the shelf until someone else brings out a competing dye." Three years passed before we heard anything further regarding Indanthrene Blue, but from 1907 on, the development of the vat dyes was rapid, and thus there began a complete revolution in the dyeing of fast colors on cotton.

When I first came to Lowell the only sulfur dye in use was Vidal Black discovered in 1893, but beginning about 1900 new sufur dyes were introduced at the rate of about one a month.

With these facts in mind it will be seen that during the first 10 years of my active interest in teaching, the naphthol dyes, the vat dyes and the sulfur dyes came into their own, and I might add

UETA[illegible]ESENTATION OF THE OLNEY MEDAL.

also the metachrome process of wool dyeing.

At that early period 60 per cent of all cotton printing was done with basic dyes and the remainder with steam mordant dyes, quite a little indigo, some Turkey red and considerable aniline black. For the most part these dyes are but little used today in printing. They have been replaced with the vats, naphthols, and more recently pigment prints.

We do not have to go back very far to the time when the cotton finisher kept on hand several kinds of starch and gum, sulfonated oil and China clay and with varying combinations of these he produced most of his finishes.

With the introduction of modern textile chemical auxiliaries the whole process of cotton finishing has been revolutionized. This branch of the industry has passed very largely from the "rule of thumb" stage to a scientifically controlled industry where the chemist has come into his own.

Many of the older men are quite familiar with the deplorable dyestuff situation which existed during the first World War. Up to that time less than 10 per cent of the dyes used in the U. S. were made here, and these largely from intermediates imported from abroad. Fortunately there was a reasonably good supply of dyes on hand when the war broke, but during the first year these were for the most part used up, and we had to turn back very largely to the old vegetable dyes. Furthermore, the production of certain shades was impossible. The prices that were charged for dyes at that time would put the present OPA in an insane asylum. There were instances where as high as $100 a pound was paid for certain dyes which were thought quite essential for shading purposes.

In view of the experiences of the first war the textile and dyestuff industries vowed that they would never be caught in the same position again, and during the next ten years there was built up in this country a dye industry which produced 90 per cent of our requirements.

Owing to this foresight and the untiring efforts of the dyestuff manufacturers and their research chemists there has been little if any serious shortage of dyes during the present war.

Among the events of a more social nature which I will always look back to with much pleasure was the visit of Sir Wm. Perkin to the U. S. in 1906, on the occasion of the 50th anniversary of his discovery of mauve, which is generally accredited as being the first coal-tar dye.

After being royally entertained in New York by the dyestuff and textile interests in that locality, Sir William was to come to Boston, where we planned to outdo New York in our entertainment and celebration.

I had the pleasure of serving upon the committee which was assigned the arranging of the whole program. One day was spent in visiting some of the large mills and points of interest about Boston. I had the pleasure of entertaining Sir William in Lowell and I remember that he showed great interest as I took him around through the Lowell Textile Institute.

Another day was spent in entertaining the entire Perkin family at the Brookline Country Club. I am fortunate enough to have a photograph of the whole party taken at that time, including the seven members of the committee, and their wives, together with Sir William, Lady Perkin and their two daughters. (See photograph—Ed.) In passing I might say that Allan A. Claflin and myself are the only two surviving members of that committee.

The whole affair wound up with a grand banquet at the Algonquin Club. It was rather difficult to entertain Sir William at some of these affairs, as we discovered that he was a vegetarian and a teetotaler and furthermore we did what was possibly the inappropriate thing, of presenting him with a magnificent silver punch bowl.

Let us now turn out attention for just a moment to the research work of the A. A. T. C. C.

Anyone who has been in attendance at the various sessions of our three day meeting, or who has even read over the program must be impressed with the distance we have come in the development of this branch of the A. A. T. C. C. program. What of the future?

Our endeavor to secure more Corpora-

Group which entertained the Perkin Family at the Brookline Country Club in 1906. From left to right they are as follows: First row—Lady Perkin and Sir William Perkin; Second row—Miss Perkin, Alan A. Claflin, Mrs. Olney, Mrs. H. J. Potter, Miss Perkin; Third row—Mrs. Clexton, Mrs. Claflin, Mrs. Walker, Mrs. Gagnebin, Mrs. Atteaux; Fourth row—Prof. H. P. Talbot, C. L. Gagnebin, Thomas J. Clexton, F. E. Atteaux, W. H. Walker, Dr. L. A. Olney.

tion Memberships, the chief support of our research work, has been encouraging. We have doubled the number of these memberships and have tripled the resulting financial returns during the past two years.

We are, however, far from the $35,000 per year goal which will be necessary as a minimum for a well sustained program. Through the efforts of our energetic and enthusiastic national and sectional committees which have been formed for the purpose of securing such memberships, we believe that we will be successful in securing the total amount.

As soon as this is accomplished, attention should be given to the building up of an endowment fund so as to inspire a sustained and dependable income. Perhaps someone will help along this latter fund by following the example of the owners of that $10,000,000 oil company which they recently gave to the American Chemical Society, and present us with a going dyestuff company or a dyeing and finishing plant.

In closing my remarks I wish to pay tribute to Mr. Alfred P. Howes, through whose initiative this medal has been established.

Through our close association no one knows better than I the innumerable ways in which Mr. Howes has cooperated to make our association the great success that it is.

Let me again express my deep appre-

ciation of the double honor which has been bestowed upon me in connection with this medal.

I trust that it will serve as an incentive for many years to come, to both young and old, towards greater achievement in the field of textile chemistry.

* * *

The Toastmaster then introduced Kenneth H. Barnard, chairman of the Intersectional Contest, who reported as follows on the results of the Contest which took place on Friday evening, October 13th:

INTERSECTIONAL CONTEST

Kenneth H. Barnard
Chairman, Intersectional Contest

KENNETH H. BARNARD: Mr. Chairman, as is usual, the $100 prize money is divided three ways—$50 for the first prize, $30 for the second prize, and $20 for the third prize.

This year, the third prize of $20 goes to the New York Section.

The second prize of $30 goes to the Northern New England Section.

And the winner—and a well deserving winner—this year is Rhode Island. (Applause.)

CALENDAR OF COMING EVENTS

Meeting, New York Section, Downtown Athletic Club, 19 West St., New York City, November 17. Symposium on "Recent Developments in Synthetic Fibers and their Uses in Fabrics." Speakers: P. D. Atwood, Nylon Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware; Rene Bouvet, Superintendent, Textile Development Unit, American Viscose Corp., Marcus Hook, Pa.; Games Slayter, Vice-President in charge of Research, Owens Corning Fiberglas Corp., Newark, Ohio.

Meeting, Philadelphia Section, November 17, 1944.

Meeting, Northern New England Section, November 17, 1944.

Meeting, Rhode Island Section, Providence Engineering Society Hall, 195 Angell Street, Providence, R. I., November 24, 1944. Speaker: Lt. Col. John H. Talbot, Medical Corps, U. S. A., Commanding Officer and Director of Research, Climatic Research Laboratory, Lawrence, Mass.: "Clothing and Equipment for the Combat Soldier."

Meeting, Southeastern Section, Atlanta Athletic Club, Atlanta, Ga., November 25, 1944. Speaker: Dr. Donald H. Powers, Monsanto Chemical Co., "What We May Expect from Resins for Textile Applications." Election of officers will take place.

Meeting, South Central Section, Patten Hotel, Chattanooga, Tenn., December 9th, 1944. Speaker: John R. Berwick, Sandoz Chemical Works, Inc., "Metachrome Dyeing of Wool."

MEETING, NEW YORK SECTION

AT the meeting of the New York Section to be held at the Downtown Athletic Club, 19 West Street, New York City, on November 17th at 8 p.m., a symposium on "Recent Developments in Synthetic Fibers and Their Uses in Fabrics" will be conducted. Speakers will include: P. D. Atwood, Nylon Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; Rene Bouvet, Superintendent, Textile Development Unit, American Viscose Corp., Marcus Hook, Pa.; and Games Slayter, Vice President in Charge of Research, Owens Corning Fiberglas Corp., Newark, Ohio. A dinner will precede the meeting.

MEETING, RHODE ISLAND SECTION

AT the meeting of the Rhode Island Section to be held at the Providence Engineering Society Hall, 195 Angell Street, Providence, R. I., on November 24th at 8 P.M., Lt. Col. John H. Talbot, Medical Corps, U. S. A., Commanding Officer and Director of Research at the Climatic Research Laboratory, Lawrence, Mass., will discuss: "Clothing and Equipment for the Combat Soldier." Dinner will be held at 6:15 at the Sheraton Hotel, 500 Angell Street, Providence.

Lapel buttons, bearing the seal of the Association can be purchased by members in good standing, from the Secretary, for $1.50 each

APPLICATION BLANKS
FOR INDIVIDUAL AND CORPORATE
MEMBERSHIP
MAY BE OBTAINED FROM THE SECRETARY
DR. H. C. CHAPIN, LOWELL TEXTILE INSTITUTE, LOWELL, MASS.

NOTICE REGARDING ANNUAL MEETING REPORTS

Beginning with this issue, reports of meetings and papers presented at the Annual Meeting, will be published as rapidly as possible. Because of limits on the amount of paper we may use we will be limited in the number of papers or reports that may appear in each issue. We will, however, exclude other articles until such time as all reports and papers of the Annual Meeting have been published.

Proceedings of the American Association of Textile Chemists and Colorists

The Treatment of Cotton Roving and Yarns with BONDING AGENTS*

H. M. CHASE

Director of Research Division, Riverside and Dan River Cotton Mills, Inc., Danville, Va.

IN RECENT years much has been said about the lack of research as applied to the textile industry and particularly the cotton textile industry. Before passing to the main subject of this paper, it might be interesting briefly to examine a few of the accomplishments of those men and women who have devoted their lives to the study and manufacture of cotton textiles.

Starting with a mass of tangled fibers which could only be formed into thread or yarn by the slow and laborious manipulation of the human hand, a group of brilliant men contributed to the so-called industrial revolution of the late 18th and early 19th centuries by developing in a comparatively short period machines for ginning, carding, and spinning this fiber and so well did they accomplish this task that even today our modern machines follow the same fundamental principles. This mechanical research still goes on; new developments appear every year, designed to reduce labor in the manufacturing of cotton; but the fundamental principles of spinning and weaving machinery remain a monumental tribute to those early research workers.

Following the mechanical research came physical research, which may be said to be a product of the present century. The expanded opportunities for scientific education and training, together with the invention and development of fine physical instruments, such as the modern compound microscope, the polarizing microscope, the X-ray Machine, the Micro-Balance, the Fiber Sorter, the Chandler Fiber Strength Tester, and other tools of the physicist have enabled a large group of scientists all over the world to probe into the innermost secrets of the cotton fiber.

The published records of this work probably exceed those of any other line of research, devoted to one tiny object—the natural cotton hair. These workers have traced the growth and development of this hair from its incipient appearance as a single cell of the seed coat to its full development and in collaboration with the bio-chemist have constantly developed new and better varieties by breeding. Their primary object has been to produce a better and stronger yarn by determining the complicated relations between the properties of the fiber and the strength of the yarn made from it.

At first sight this might seem to be a simple problem, but when you consider the infinite variability of this fiber in its length—in its fineness—its eternal chemical and physical structure—in its intrinsic strength and the effect of natural causes, such as climate, weather, soil, etc., on each one of these variables you are faced with combinations which are still only partially understood. The underlying stimulus to this vast program of physical research is easy to understand. It is our failure to realize by the spinning operation more than a fraction of the potential strength of the raw product. Opinions differ as to the size of this fraction but leading authorities place it at not more than 35 per cent and probably considerably lower than that figure. The average tensile strength of a good grade of American Upland cotton may be placed at around 80,000 pounds per square inch and some varieties may test as high as 120,000 pounds. A cotton rope of 1 inch square section would, if its full strength were utilized, hold suspended a modern 40- to 60-ton tank. A skein of yarn breaking at 100 pounds would, under the same conditions, sustain a stress of 300 pounds or more.

To modern ingenuity and imagination this is a stimulating challenge. To double this percentage or even increase it by 50 per cent would have world-wide consequences in the field of industrial yarns, which is rapidly expanding and insistently demanding greater and greater strength.

What might be called the third stage of textile research began at a fairly recent date and may be described as the application of chemistry to cotton fabrics in order to give them new and desirable properties, such as permanent finish, improved hand, anti-crease, water repellancy, shrinkage stabilization, better color fastness, etc., as well as resistance to wear and to the action of fungi and bacteria. This type of investigation has been accelerated by the developments in the field of polymerization which have given us the textile chemists literally thousands of new organic polymers and synthetic resins capable of application to fabrics. So rapid has been the growth of this branch of research that textile manufacturing may truthfully be classed as a chemical industry.

Strange to say, however, it does not seem to have occurred to but very few investigators that the goal sought by the physicist and bio-chemist might be reached by chemical methods, along the same lines as those applied to woven and knitted fabrics. With 60 per cent or more of the strength of the raw product lying dormant, ready to be utilized, what more fruitful line of research can be imagined.

In approaching this problem, the natural conclusion might be that the principal obstacle to be overcome would be the tendency of the individual fibers which go to make up a given yarn, to slip one upon the other and to a very considerable degree this is the case. It is to prevent this slipping that from time immemorial spun yarns have been given a twist. This feature itself has been the subject of many practical and theoretical studies. If the twist is insufficient there is loss of strength, due presumably to slip. If the twist exceeds a certain optimum, strength is again lost, due in this case to the shearing action of the fibers upon each other. It is interesting to note that nature herself has made use of this device in building this fiber as shown by this slide† loaned through the courtesy of Dr. Schwarz of M. I. T. (1) To digress for a moment, the following slide** loaned through the courtesy of Dr. D. F. J. Lynch of the So. Regional Research Laboratories, shows the infinite fineness of this fiber. This slide is always amazing to me, for it seems hardly possible for a fiber which is plainly visible to the eye and only an inch or so in length to be from 2,000 to 4,000 times as long as it is wide. To this extreme fineness is due the fact that a slight twist of approximately 25 degrees with the axis

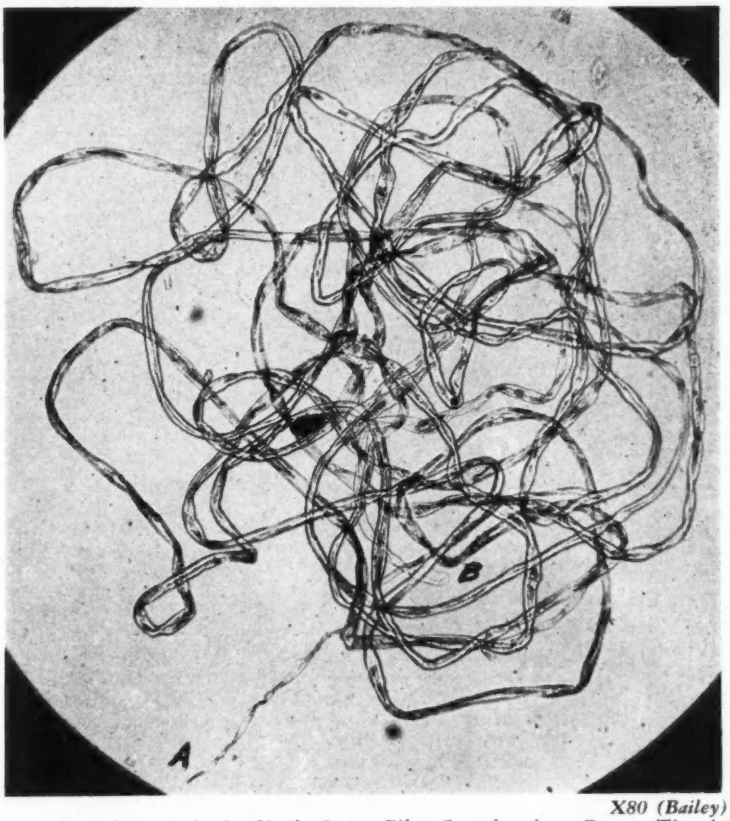
* Presented before the Annual Meeting, Atlantic City, N. J., Oct. 14, 1944.

† See figure 1.
** See figure 2.

Fig. 1—Fibrillar Structure of a Single Fiber.

of the yarn is able to hold the fibers in place. In a yarn with optimum twist, however, you will see at once that this angle becomes progressively smaller as we go to the center and that the most central fibers have no twist at all. How, then, do they contribute to this optimum strength? Obviously, if we pull on the yarn the outside fibers begin to close on the central ones, with a grasp that becomes tighter and tighter, until the limit of rupture or slip is reached. The longer the fibers in proportion to their cross-section, the more powerful this grasp and the stronger the yarn.

The complete analysis of the relation of strength of yarn to character of fiber is by no means as simple as this. It also depends upon the strength of the fiber per unit of cross-section; upon the uniformity from end to end and as compared with its companion fibers; upon its maturity and even upon the chemical character of its cellulose. With all these variations and irregularities this fine cotton hair is the fundamental unit of textile manufacturing. Now the strength of the yarn depends also upon the uniformity of the yarn itself and this in turn depends upon its preparation in the early stages of processing—upon the greatest possible parallelization of the fibers—upon their uniformity in length, etc. This quality of uniformity is of great importance and will be referred to later. With reference to it, I might call your attention to the fact that a skein of yarn (120 yards) would, if the yarn were perfectly uniform, break at 160 times the break of its single components, whereas it is often 50 per cent weaker than this, thus again showing the tremendous possibilities for improvement. On the other hand, a two-ply yarn is roughly 20 per cent more than double the strength of its components, due to the firmer grasp of the double twist upon the fibers and to the fact that there are no fibers which do not have a spiral arrangement.



X80 (Bailey)

Fig. 2—Microphotograph of a Single Cotton Fiber Complete from Base to Tip. Actual Fiber Length— 1¼". Note A and B—the ends of the fiber.

The ideal yarn would, therefore, have the following characteristics; first, all component fibers would be alike and of maximum strength per unit of cross-section; second, each would bear its proportion of the load; third, rupture would occur at the breaking strength of the fibers; in other words, there would be no slip; fourth, the yarn should be perfectly uniform in cross-section, that is, there should be the same number of fibers per unit of cross-section throughout.

The first requirement we must perhaps leave to the physicists and bio-chemists, trusting that their researches will still further clarify the complicated relations between fiber characteristics and strength of yarns and how to control these variables. Nevertheless, possibilities exist that the defects of the natural fiber may be improved by chemical treatment. Some claim that Mercerization actually does this, although opinions still differ. It would not seem entirely impossible to so treat the yarn that the immature fibers would be strengthened proportionately more than the ripe fibers, due to the greater porosity of the primary wall and to the larger dimensions of the interior channel or lumen.

The second requirement that each fiber should bear its proportion of the load is not so difficult. Suppose under proper conditions we throw a strain on our yarn. If there were no slippage we would doubtless strain or break those fibers properly positioned to carry their full load, while those not so placed would not be affected. But if by chemical treatment our fibers are given a pre-determined slipperiness and can slide without undue strain, the loose ones will come into adjustment with their fellows just as the reins of a six-horse team are adjusted to uniform tension by the driver.

Now our third requirement prescribes lack of slip, while in dealing with our second we have specifically called for slip. This brings to mind Ball's Paradox of Cotton Spinning, (2) which may be briefly stated as follows: During drafting cotton must be slippery. Afterwards it must be sticky. The tension which we have thrown upon the yarn is in effect a drafting action, during which the fibers must slip. Afterwards there must be no slip. This paradoxical problem presents no difficulty. Under the treatment given, the yarn is first rendered plastic during the stretching operation and subsequently set by heat or other means, so that the

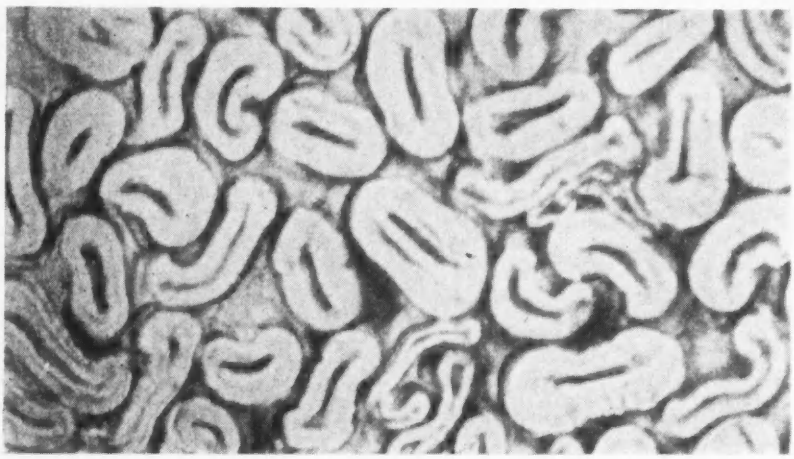


Fig. 3—Cross Section of American Cotton Fiber showing Variation in Wall Thickness and in Dimensions of the Lumen.

friction increases far beyond that of the natural fibers. Obviously, this can be done in a single operation.

Clues to the possible strengthening of yarn have existed for many years, as for example, in the application of starch and similar products. A starch sized yarn, as is well known, increases in strength from 15 per cent to 30 per cent, due to the binding of the fibers. In these applications, no emphasis has been placed upon tension as a means of increasing the strength.

PRACTICAL APPLICATIONS OF PRECEDING PRINCIPLES

The application of the foregoing principles is of such recent date that the literature on the subject is almost nonexistent, outside of what may be found in the patent records. Even this is meager. It is in fact rather strange that the attention of chemists and physicists has not turned to the somewhat obvious opportunity of strengthening the fundamental unit of cotton textile manufacturing by chemical means. To quote Dr. R. W. Webb, "That in so far as the unit of manufactured product is concerned, the cotton textile industry hangs by a single thread; that the fundamental unit of that thread as well as of all the entire cotton enterprise, from the producer to the consumer—in so far as raw cotton is concerned—is the *single fiber;* and that, in so far as fiber properties and qualities are concerned, the law of averages saves the cotton enterprise and the textile industry." (3) With the rapid expansion of industrial uses of cotton, we might add that the competitive position of the industry depends upon the strength of that thread.

Probably the first chemical treatment of yarn which resulted in an increase of tensile strength was Mercerization. As known today, the primary object of Mercerization is not necessarily to add to the strength of the yarn and there are conflicting views as to whether or not it does do so. Under the tension applied in the modern process, compacting of the fibers undoubtedly takes place and possibly increasing friction results.

As far as the patent literature discloses, stretching to improve strength was done by Sessions, (4) in 1930 and by Brownell, (5) in 1937. No chemical treatment was involved except in one case a rapid passage through water. In 1937 Gwaltney, Graybill and Newton (6) applied stretching to tire cord after a complete saturation with water followed by ageing. The results of this treatment were outstanding. The saturation and ageing process softened and swelled the fibers, making them more plastic and the subsequent stretching nearly to the breaking point and drying while in a tensioned condition produced a uniform cord of high strength.

The application of chemicals other than water combined with stretching nearly to the breaking point was done by Jennings (7). His procedure consisted in applying the bonding materials in the form of a solution or emulsion to the yarn or cord, stretching the yarn to as near the breaking point as practical, while the resins were in the plastic stage, and then setting the bonding material on the fibers. His first work was done for the shoe thread field and shoe threads were said to have been produced in which the tensile strength was increased 70 per cent or 80 per cent. The stretch was taken out of the cotton yarn and at the same time the strength increased so that it compared favorably in properties with linen thread.

Both of the last two workers pointed out that to obtain the maximum tensile strength, the yarn must be stretched while in the plastic condition to approximately the breaking point, in order to obtain the maximum increase in tensile strength. They also found that this increase in tensile strength was not a linear function of the tension in the plastic state, but that by far the greatest increase in strength in the final product was obtained within the last few percentages of the breaking point.

Specifically, in the use of shoe thread, it was found that if the residual elongation in the 10/8 was less than 1 per cent, the tensile strength would be doubled. However, such a thread could not be used commercially in shoe manufacture because in spite of its high tensile strength, it did not have enough elasticity for a lock stitch. Upon experimentation with shoe threads of different percentages of residual elongation, it was found that a thread with 3 per cent residual stretch would operate very well commercially and give a very tight seam. However, when this amount of residual stretch was left in the yarn, the tensile strength was only increased 70 per cent over the untreated yarn. Another example of the same problem with more exacting requirements was that of the manufacturer of tire cord, in which many of the standard specifications required a cord which had from 6 per cent to 7 per cent stretch at 10 pounds. To produce a tire cord to meet specifications and at the same time greatly increase the tensile strength was a difficult problem, for it meant that a tension of only possibly 10 per cent or 15 per cent of the breaking strength of the tire cord could be applied to the processed yarns to fill this stretch specification. Such an application of tension would produce a cord with only a small percentage increase in tensile strength as compared to the 70 per cent increase if the cord were stretched to approximately the breaking point. However, the solution of this problem was found in what might be called a re-stretching process. The same procedure as outlined above, in which the cord was stretched nearly to the breaking point, was followed, thus adjusting the fibers and strands while in plastic condition and then setting them in this condition. Such a procedure gave a stretch or elongation of possibly 2 per cent at the breaking point and an increase of 60 per cent or 70 per cent in the tensile strength. The cord was then rewet and re-stretched, controlling the tension so that it would leave a predetermined amount of elongation in the cord.

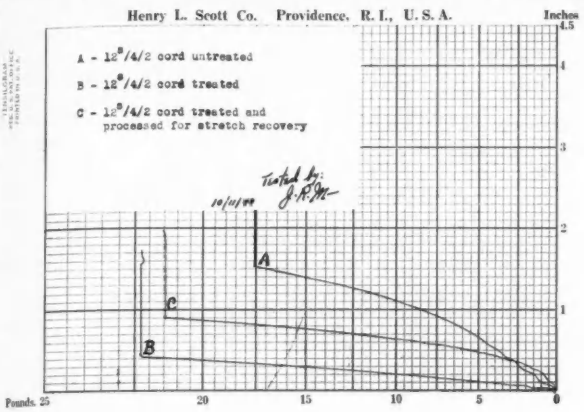


Fig. 4—Tensilgram (See legend in box).

By this procedure, the residual elongation demanded by the specifications was left in the cord and at the same time there was only a 10 per cent or 15 per cent loss in the greatly increased tensile strength produced by the first process or step. That is, by this two-step process, a tire cord could be produced which met the specifications as to elongation and at the same time had an increase of tensile strength of better than 50 per cent or 60 per cent over the untreated cord. It is evident that if this tensile strength was retained to such an extent after this second step, that the first step had an important and fundamental effect on the character of the yarn.

It is needless to say that these data represent only a beginning in this development and that there are many possible applications and commercial products which remain to be explored and developed. The comparatively new developments based upon polymerization offer literally thousands of synthetics differing in properties from which to select the most suitable to meet any prescribed specification. They may be thermoplastic or thermosetting. They may be combined with pigment for color, chemicals for mildew-proofing, fire-proofing, etc. The yarn may be made soft and flexible or hard as wire, according to the use to which it is to be put. It may be treated so as to be compatible with rubber for tires and belts; in fact, there seems to be no end to the possibilities of this line of research.

In the foregoing remarks I have endeavored to outline the progress of the engineer, the physicist, and the chemist, in the endeavor to develop a better and stronger yarn from the cotton fiber. I have tried to show the steps of this progress and the very considerable achievements which have been obtained. Beginning with the crude, handspun thread, we have passed to the mechanically spun yarn, with optimum twist, with improved fiber characteristics, and finally to chemically treated yarns of the highest strength yet obtained; always you will note with reference to the conventional product, that is to say, the more or less finely spun thread produced by the spinning frame and the twister.

Is it possible that there might be some other approach to this problem? I will answer this question by introducing to you an entirely new and revolutionary idea—the production of high strength, industrial yarns without the use of the spinning frame.

Consider for a moment the processes involved in the production of an average ring spun, multi-ply yarn, composed of single 12's yarn. The single 12's yarn has a breaking strength of 1.5 pounds. From the spinning frame this goes to the spooler or winder, thence to the warper, and from the warper to the twister, where four single threads are twisted together, making what is known as a four-ply yarn. Its strength is now 7.1 pounds, or four times that of the single yarn plus 18 per cent, a considerable improvement. It then goes to the finishing twister, where two of the four-ply yarns are twisted together. Its breaking strength is now 15 pounds, or eight times that of the single yarn plus 23 per cent, an additional improvement. Chemically treated by the process previously described, its breaking strength is now 22.75 pounds, or a total increase of 89 per cent. Its equivalent size should now be one-eighth of 12, or 1.5, but due to the contraction of its spiral construction, it will actually size 1.20.

Now, here we have what you will recognize as single roving. Its size or number is 1.5, that is, it is the equivalent of eight strands of the 12's yarn which we twisted together as described above. In fact, it is a little lighter in weight than the twisted yarn, as it has not suffered contratction. It has comparatively little twist and compared with the twisted yarn, very little strength.

Fig. 5—Cross Section of Untreated 12/4/2 Ply.

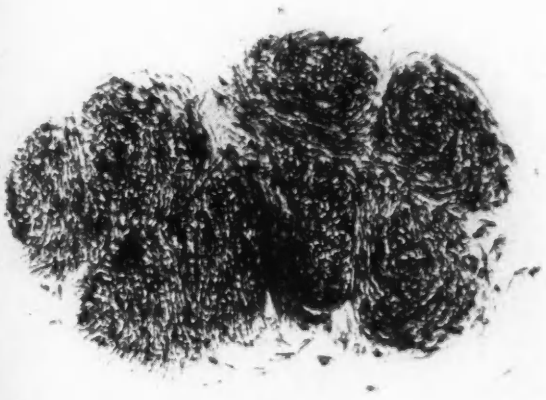


Fig. 6—Cross Section of Treated 12/4/2 Ply.

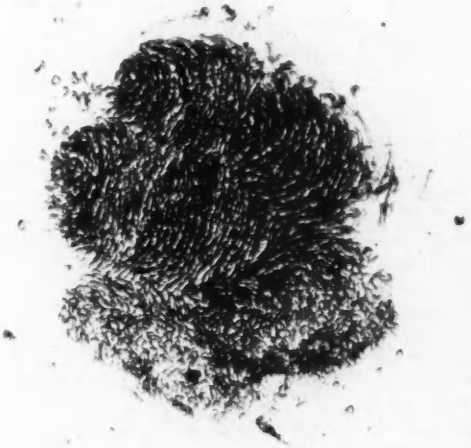


Fig. 7 (ABOVE)—Cross Section of Untreated 1.50 Hank Roving.

Fig. 8 (ABOVE)—Cross Section of the Roving in Fig. 7 after Treatment.

Fig. 9 (BELOW)—Cross Section of Chandler Bundle

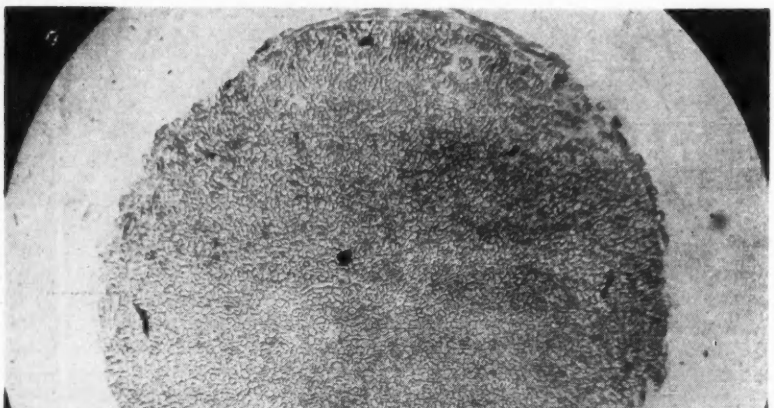
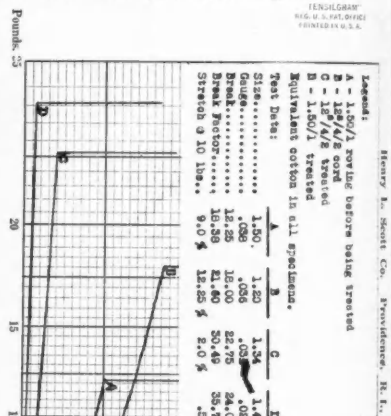


Fig. 10 (BELOW)—Tensilgram (See Legend).



Now suppose we decided to put this roving through the stretching and bonding process previously described. First of all, it will be observed that we have conformed more completely to our specifications for the ideal yarn, inasmuch as the individual fibers are not tightly bound by the successive twists of the 12/4/2, with the result that there is no shearing action due to the complicated twists of the plied yarn. They are free to adjust themselves under tension. Secondly, as is well known to the spinner, the roving is always more uniform than the yarn spun from it. Thirdly, the softness of the roving is very much greater than that of the ply yarn, or even the single 12's yarn of our example. It is, therefore, more easily penetrated. Finally, there will be much less shearing action under stress than in the case of a ply yarn, as the fibers are practically all parallel.

By chemically treating, stretching, compacting and curing this roving, a product is obtained breaking at 24 pounds, which is even higher than the strength of the above example of multi-ply yarn, being an improvement over the combined strength of the eight single strands of 100 per cent.

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(5) U. S. Pat. No. 1,962,424 — George L. Brownell.

(6) U. S. Pat. No. 2,103,218—Eugene C. Gwaltney, Leon A. Graybill, and Russell B. Newton.

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Grateful acknowledgement is made to Dr. E. R. Schwarz of M. I. T. and to Dr. D. F. J. Lynch and Mr. T. L. W. Bailey, Jr., of the Southern Regional Research Laboratories, U. S. Dept. Agric., New Orleans, La., for the loan of slides and photographs.

TRADE NOTES • NEW PRODUCTS

• MATHIESON ALKALI PROMOTION

H. R. Dinges, of The Mathieson Alkali Works, has recently been placed in charge of technical service on Textone applications in Southern textile industries.

H. R. Dinges

Mr. Dinges, who received his chemistry degree from the College of William and Mary, left the Smokeless Powder Division of E. I. du Pont de Nemours, in 1941, to join the Mathieson Sales Development Department. He worked out of Mathieson's Providence office until September, 1942, when he was transferred to the Charlotte, N. C., office. He will continue to work from the Charlotte office in his new position.

• JOINS AMERICAN VISCOSE

Arthur N. Tingley has joined the Textile Research Department of the American Viscose Corporation and will be associated with its Knitting Division with headquarters in the department's offices at Marcus Hook, Pa.

Mr. Tingley was previously with Textron, Inc., where he was director of control laboratories and located at the company's Lowell, Mass., plant. Prior to assuming that position, Mr. Tingley was connected with the Atlantic Rayon Corporation's plant at Providence, R. I., where he was engaged in production and research work. He received his formal education at the Massachusetts Institute of Technology, where he specialized in chemical engineering.

• RETURNS TO CALGON, INC.

Calgon, Inc., Hagan Corporation and Hall Laboratories have announced the return to the textile and power field of Maj. W. D. Smith, formerly with Calgon representatives Eshelman & Potter, Birmingham and Charlotte, prior to entering army service two years ago. Maj. Smith, whose home city is Greenville, S. C., served in the Chemical Warfare Service at Fort Blanding, Fla. He returns to aid Eshelman & Potter with water problems in the textile and other fields of the South, and for a short time will check home office researches on water conditioning at Pittsburgh.

• JOINS SOUTHEASTERN COTTONS

Albert J. Huber has joined the New York office of Southeastern Cottons, Inc., as a technician, and will specialize in the development of spun rayon fabrics and mill contact work. Mr. Huber previously was with the Fabric Development Department of the American Viscose Corporation.

• JOINS GIVAUDAN-VIRGINIA

Charles P. Wilson, Jr., formerly of the Chemical Section of the War Production Board, has joined the staff of Givaudan-Virginia, Inc. of 330 West 42nd Street, New York City, and will handle the sales of Anhydrous Aluminum Chloride.

• NEW BOOKLET ON POLYETHYLENE RESINS

The Plastics Division, Carbide and Carbon Chemicals Corporation, 30 East 42nd Street, New York 17, N. Y., has just published a 12-page booklet on Polyethylene resins and plastics. Entitled, "Polyethylene Resins," the brochure describes the forms, properties, fabrication procedures, and uses of this new group of thermoplastic materials.

Interesting data tables are included which present graphic summaries of the plasticity, electrical properties, and thermal expansion of this latest resin. All available information which has been gathered to date is presented in "Polyethylent Resins." Copies of the booklet are available to engineers, chemists, and executives upon request.

• PUT ON CONSULTANT BASIS

Five "dollar-a-year" men of the Cotton and Synthetic Textiles Division, Textiles, Clothing and Leather Bureau of the War Production Board, have been relieved of their day-to-day operating duties by assignment to a consultant status, George H. Lanier, Jr., director of the Division, announced today.

The executives are Harry L. Dalton of Charlotte, N. C., Dr. A. L. Lippert of Wilmington, Del., Alex Barth of New York, Walter E. Greer of Greenville, S. C. and H. G. Woodbury of New Bedford, Mass. The first named has been deputy director of the Cotton and Synthetic Textiles Division for the past year. The other four have been chiefs of the Dye and Finishing Branch, Rayon Converting Section, Synthetic Fabrics Section, and the Combed Goods Section, respectively.

M. H. Goldman of Boston, who has been chief of the dyestuffs section, has been assigned to succeed Dr. Lippert as Chief of the Dye and Finishing Branch. Mr. Goldman is a Lowell Textile Institute graduate and was formerly associated with Calco Chemical Company. He operated his own chemical manufacturing business in Boston prior to entering Government service with the Office of Civilian Supply, in December 1941. He joined WPB textile division in May 1942 as chief of the Wool Dye Unit, and became chief of the Dyestuff Section in December 1943.

• APPOINTED ASSOCIATE DIRECTOR OF RESEARCH

Promotion of Dr. Richard M. Hitchens to the position of Associate Research Director of Monsanto Chemical Company's Organic Division has been announced by Osborne Bezanson, Divisional General Manager.

• KOPECKY JOINS HEYDEN

Ferdinand F. E. Kopecky has joined the Heyden Chemical Corporation as patent attorney.

• A NEW PRODUCT FOR WOOL SHRINKAGE CONTROL

A new shrinkage control method for wool which retains the original appearance of the fabric and supplies long needed protection against repeated laundering and dry-cleaning is now commercially available through the use of a new synthetic resin manufactured by American Cyanamid Company and trade marked under the name "Lanaset," according to an announcement by the Calco Chemical Division of the American Cyanamid Company.

Lanaset, a melamine resin, has been tested by a number of leading mills and finishers. Lanaset wool shrinkage control has also been used by the United States Army Quartermaster Corps for testing, among other items, three-quarters of a million yards of wool sleeping-bag fabric, it is stated.

Lanaset is said to stabilize wool and wool blends without affecting the absorbency normally characteristic of wool.

It also reduces felting, prevents pilling and fuzzing and wool treated with Lanaset is said to have a much higher resistance to alkali than untreated wool.

Another advantage of Lanaset, according to Calco's reports, is the simplicity of its application. The fabric is passed through an aqueous bath containing the resin, and squeezed uniformly through a mangle, dried and heat cured, and given a light wash to remove surface resins. The application is said to be permanent for the life of the fabric.

The method of applying Lanaset is described in the American Cyanamid Company U. S. Patent No. 2,329,622.

Mills that process wool and blends of wool and rayon can make immediate full-scale runs with Lanaset for trial on their lines.

• STEIN HALL ELECTION

Stein, Hall & Co., Inc., New York, manufacturers and distributors of Starches, gums and dextrines, and importers of burlap and other commodities, has announced the election of J. P. Strasser as a vice-president of Stein, Hall Mfg. Co., Chicago.

• JOINS HOOKER SALES STAFF

The Hooker Electrochemical Company, Niagara Falls, New York, announces the appointment of Herbert Heesch to its sales staff in the northern New Jersey area. Mr. Heesch was graduated from

Herbert Heesch

The University of Rochester as a Chemical Engineer in 1932. He first joined the Hooker sales staff in 1933, serving the eastern states until 1937. Prior to his recent appointment, he was a salesman with the Heyden Chemical Corporation. His varied experience in the chemical field will be a valuable asset to the users of Hooker chemicals in his territory.

• "ROYCE REPORTER"

On the occasion of the twenty-fourth annual meeting of the A.A.T.C.C., held last month in Atlantic City, N. J., the Royce Chemical Co., of Carlton Hill, N. J., launched the first issue of its house organ —the Royce Reporter, in enlarged format. This special convention issue was distributed to the more than twelve hundred members and guests attending the meeting.

A most interesting feature of this publication was the story of the organization of the A.A.T.C.C., and its growth from sixty original members to more than three thousand. It was profusely illustrated with pictures of past and present officers of the association, and "shots" from previous meetings.

It is planned to publish the Royce Reporter several times a year. It will contain articles of paramount interest to chemists and executives in the dyestuffs and textile industries. It is also planned to publish an A.A.T.C.C. Convention Issue each year due to the enthusiastic reception of the first issue and its contents.

• NEW PONEMAH FABRIC

McCampbell & Company, 40 Worth Street, selling agents for Ponemah Mills of Taftville, Conn., have announced the promotion, distribution, and advertising plans for the new Ponemah spun and woven fabric, a new kind of spun rayon which has been developed in the past eighteen months.

The fabric will be promoted as the first new post-war fabric, since the fiber of which it is made as well as the construction of the cloth, were developed during wartime. The fiber is the American Viscose 1.0 denier staple, which was perfected as a result of the need for high tenacity cording for bomber tires. The Ponemah cloth is the result of over a year's experimentation with the spinning of this fiber into a yarn, and the weaving of the yarn into a smooth, opaque, cloud-weight, strong cloth suitable for a wide variety of women's and children's garments, and for men's shirts.

Although there will be only a limited quantity of the cloth available for civilian use until reconversion takes place, the looms of Ponemah Mills being almost entirely devoted to government work at the present time, the product is being distributed to six converters in New York and California.

• COTTON TESTING LABORATORY

Through a cooperative arrangement with the Textile School at Clemson College, Clemson, S. C., a modern cotton testing laboratory has been made available to the Division of Technical Service, Cotton-Textile Institute, according to an announcement yesterday by Dr. C. T. Murchison, Institute president, and Dr. R. F. Poole, Clemson College president.

The purpose of the laboratory is to make available to cotton mills facilities for training their laboratory workers in the technique of fiber testing. Many mills in recent years have established fiber research laboratories in connection with their cotton departments and quality control programs. A number, however, have had difficulty in securing trained personnel.

• TESTING OF NEW FINISHES DISCUSSED AT COMMITTEE D-13 MEETING

Wide-spread interest in the new finishes developed just prior to the war and also to meet military requirements led Committee D-13 of the American Society for Testing Materials to devote the General Session of its meeting held October 19 to a symposium during which the speakers outlined the physical and chemical tests which would determine whether or not the new types of finishes are satisfactory for the purposes intended. It was realized that in addition to the immediate interest involved in military fabrics, there is an important post-war implication in this subject. Another feature of the Committee D-13 meeting was the presentation at the dinner, by Dr. Harold DeWitt Smith, of A. M. Tenney Associates, of his Edgar Marburg Lecture, "Textile Fibers — An Engineering Approach to an Understanding of Their Properties and Utilization," which he first delivered at the annual meeting of the A.S.T.M. last June. The request for its repetition came from many who heard it then, as well as many who had been unable to attend that meeting.

The general Papers Session was opened by Douglas G. Woolf, chairman of the Sub-committee on Papers and Publicity, who introduced J. Robert Bonnar, acting chairman of the Sub-committee on Bleaching, Dyeing and Finishing. Mr. Bonnar presented the speakers who included: Dr. Louis C. Barail, head of the bacteriological department of United States Testing Co.; Werner von Bergen, director of research and control laboratory, Forstmann Woolen Co.; and J. B. Goldberg, technical director of J. P. Stevens & Co.

• ASST. DIRECTOR, PUBLIC RELATIONS

The appointment of Glen C. H. Perry, a Washington correspondent of the New York Sun, as assistant director of the Public Relations Department has been announced by E. I. du Pont de Nemours & Company. The appointment was effective October 1.

Simultaneously, the appointment of Charles M. Hackett as assistant to the director of the Public Relations Department was announced.

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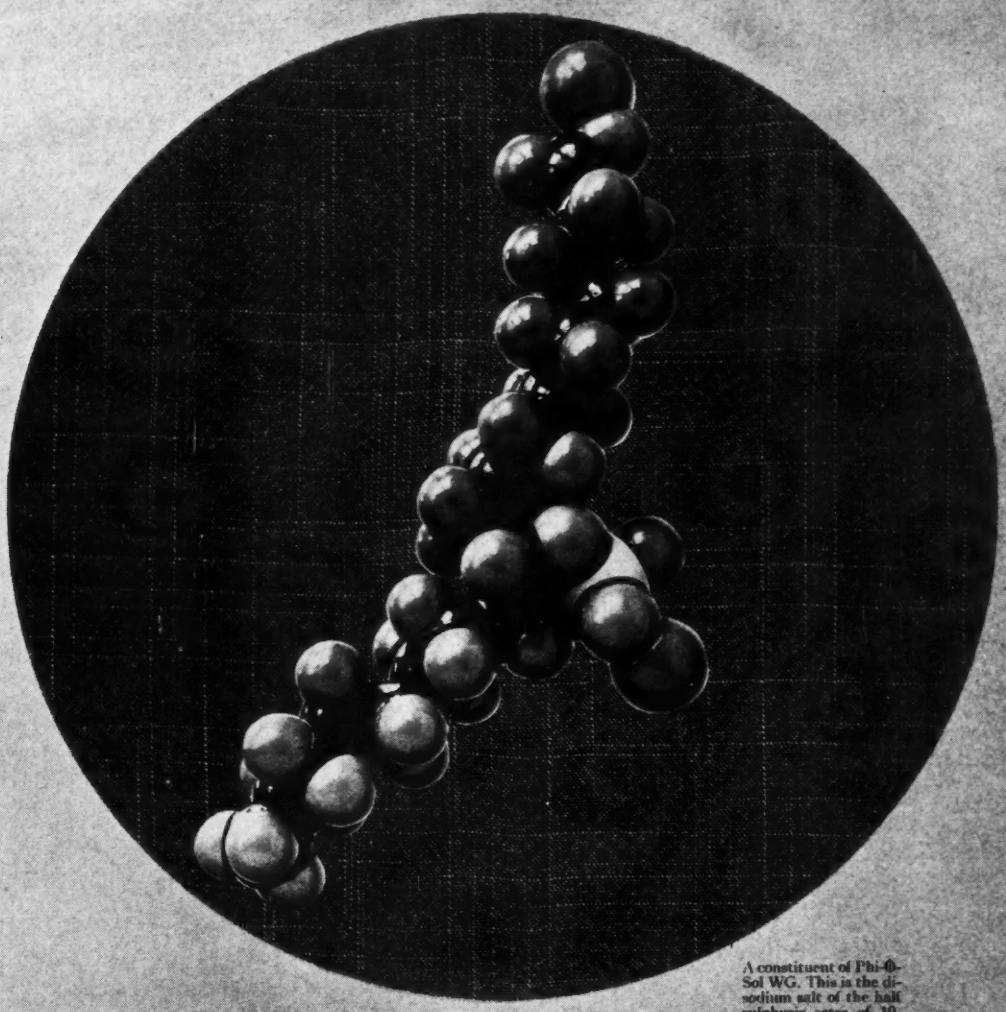

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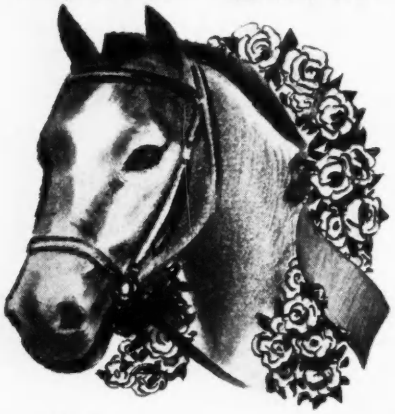

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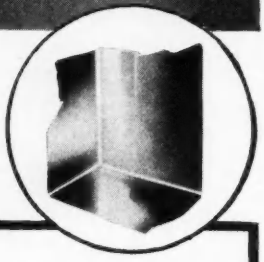

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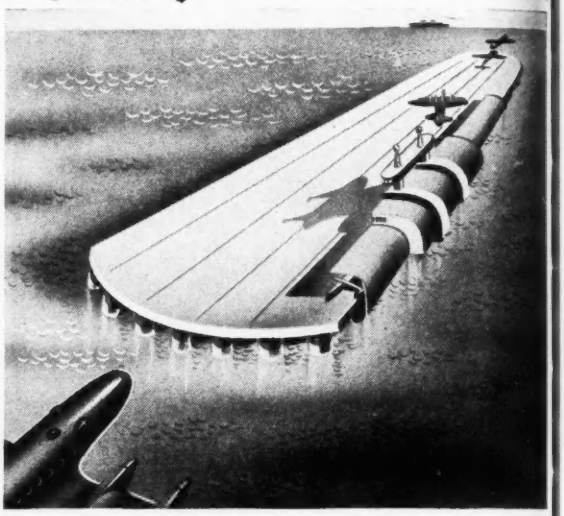

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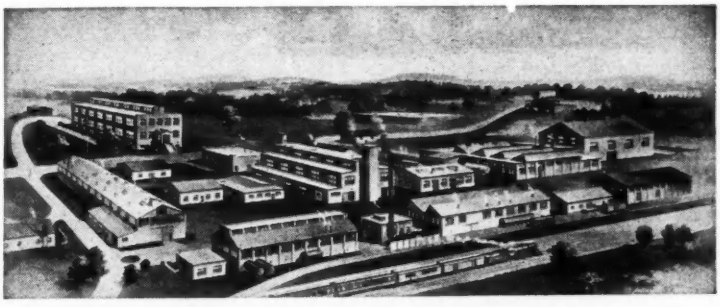

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The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $6.25 per column inch or less per insertion.

POSITION WANTED: Hosiery Dyer both technical and practical, with several years experience, capable of doing any hosiery dye job. Draft status 1-A-H. Box 592.

POSITION WANTED: Textile chemist, honorably discharged, long experience here and abroad in manufacturing chemical specialties for the textile industry, seeks connection with large textile dyer and/or printer who wishes to manufacture his own chemicals at very low cost. No expensive equipment needed. Manufacturers of chemicals also considered. Employed at present but available within one week. Box 609.

POSITION WANTED: Boss Dyer and Superintendent of dyeing and finishing. 45 years old, draft exempt, can go anywhere if things are right, also have had twenty odd years experience dyeing of cotton, rayon and acetate crepe piece goods, boxes and jiggs, all kinds of women's dress goods and men's tie goods, also high class lining for men's smoking robes. Would like to go in partnership. Box 612.

POSITION WANTED: Bleachery superintendent, 42 years old, with over twenty years technical and practical experience in bleaching, dyeing and finishing of cotton and rayon piece goods. Box 613.

WANTED: District Sales Representative—An outstanding manufacturer of textile chemical processing specialties has an important position open in the states of Georgia and Alabama, for a man with the proper qualifications. A technical school graduate with practical mill background is essential. Unlimited opportunity for the Post War Period. In replying give complete business record for the past ten to fifteen years, references, family status, whether presently employed, and enclose recent snapshot (not returnable). Our organization knows of this advertisement. Box 616.

WANTED: Research chemist for work in fields of resins and pigments. Excellent laboratory facilities, ample opportunity for advancement. Location near New York. Box 618.

WANTED: Salesman, acquainted with Textile Chemical specialties, sulphonated oils, finishes, etc., to travel among dyers and finishers of wool, cotton, silk and synthetic fibres. State qualifications, age and background. Box 619.

WANTED: Chemist and Textile Colorist for branch laboratory of dyestuffs manufacturer. Location Middle Atlantic States. State age, education, experience and salary desired. Box 620.

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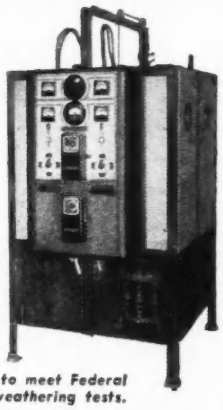

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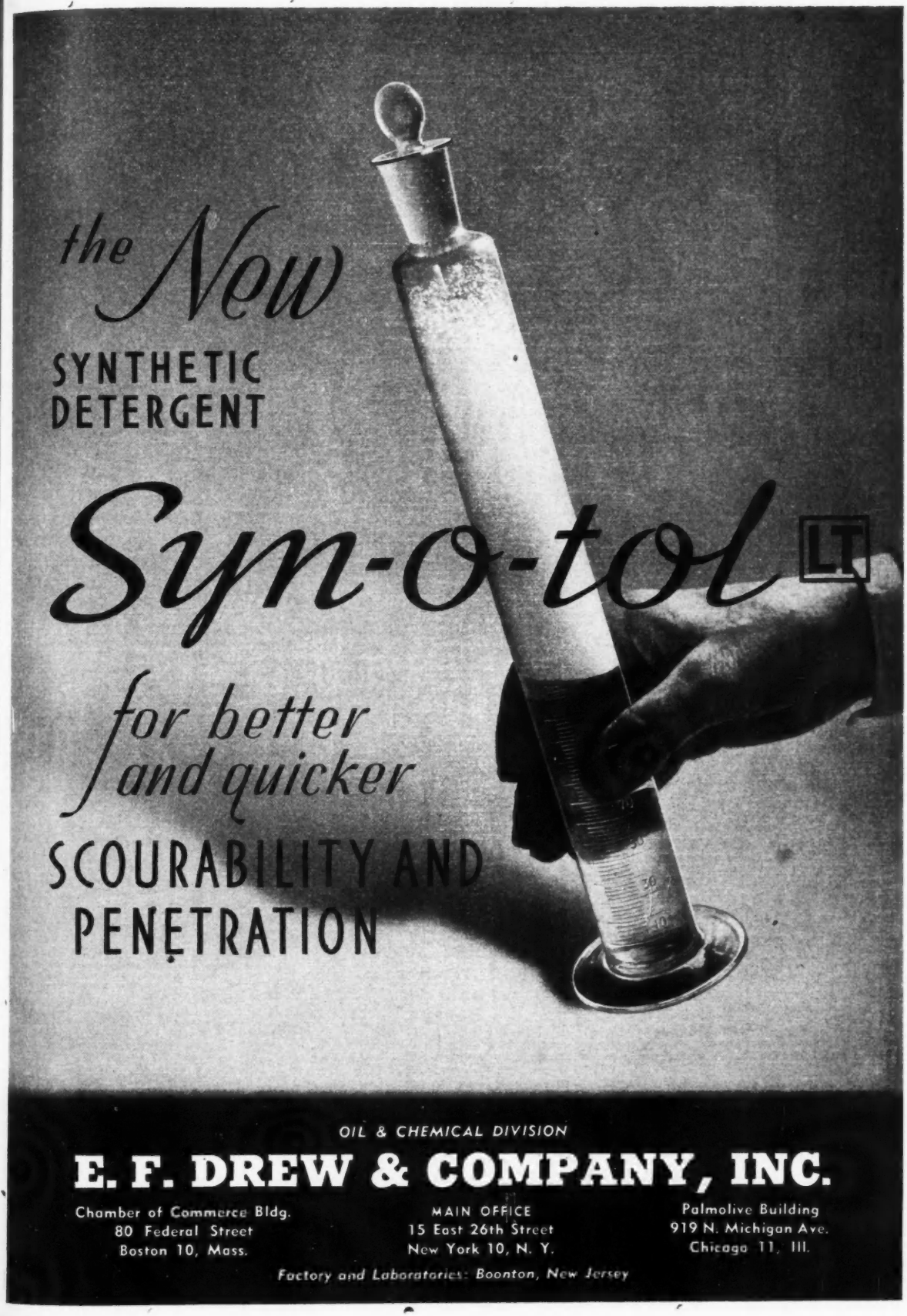

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